M&V 2.0: What It Is, How It Works, and Why It Matters

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What is M&V 2.0?

> A defining criterion for automated M&V software is that it continuously analyzes data as it becomes available.

New York Dept. of Public Service, EM&V Guidance, Nov 2016

Floating Names

M&V 2.0	EM&V 2.0	Advanced M&V (NY REV)	Automated M&V (NEEP)	ICT-Enabled EM&V (ACEEE)

States Taking the Lead on M&V 2.0

NY	2016: EM&V Guidance "encourages" use of "Advanced M&V" for data collection and analysis for impact evaluation
CA	2015: Order requires "data collection strategies embedded in the program" and "internal performance analysis during deployment."
CT	2016 State receives DOE SEP grant for EM&V 2.0 pilots
NM	2016 Statewide RFP include optional scope for "M&V 2.0" solutions
MO	In progress: Report on how EM&V 2.0 can support deemed savings updates for statewide TRM
MD	Feb 2017: EmPOWER order calls for use of "tracking actual energy savings…in real time…" for the home performance program

NY Evaluation Guidance in detail

Three important policy changes

#1 – Encouragement
"Program administrators and evaluators are encouraged to use advanced M&V techniques when appropriate and cost effective, to collect, aggregate and analyze data.
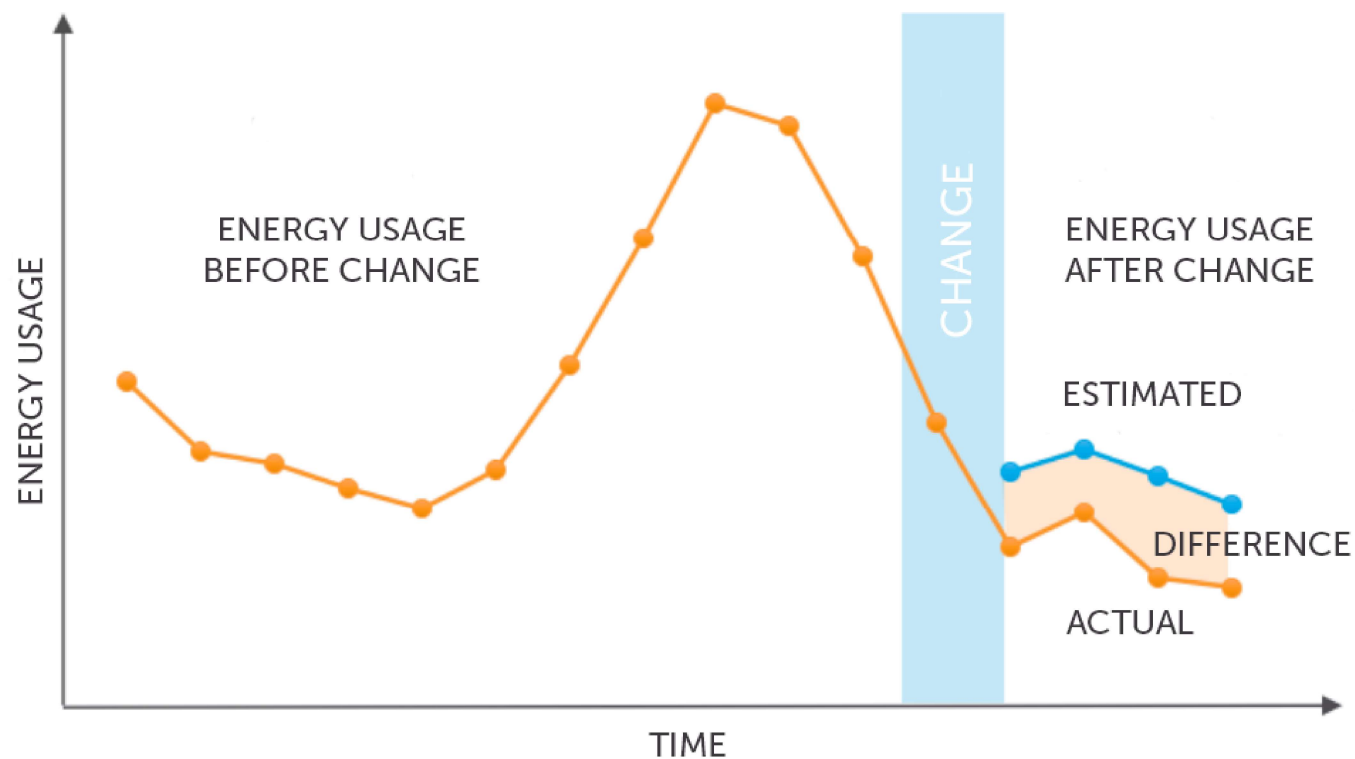
#2 – Budget sharing
"In instances where advanced M&V tools support program implementation and evaluation, the costs of implementing systems that generate data may be shared between program implementation and evaluation budgets."
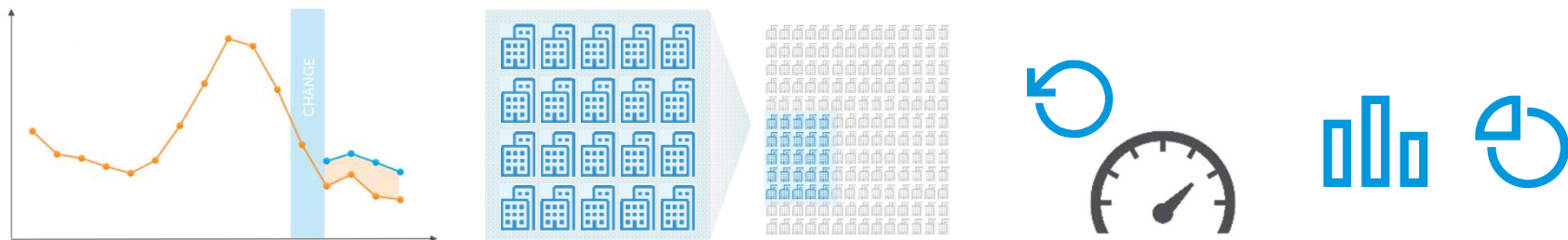
#3 – Formal impact analysis
"In instances where advanced M&V tools are providing continuous savings estimates for a particular energy efficiency activity, and the data and analysis has been assessed to determine the reliability of the information, program administrators may be able to extend program EM&V cycles and rely on the advanced M&V tools to provide interim impact results."

How Does M&V 2.0 Work?

M&V 2.0: How it Works

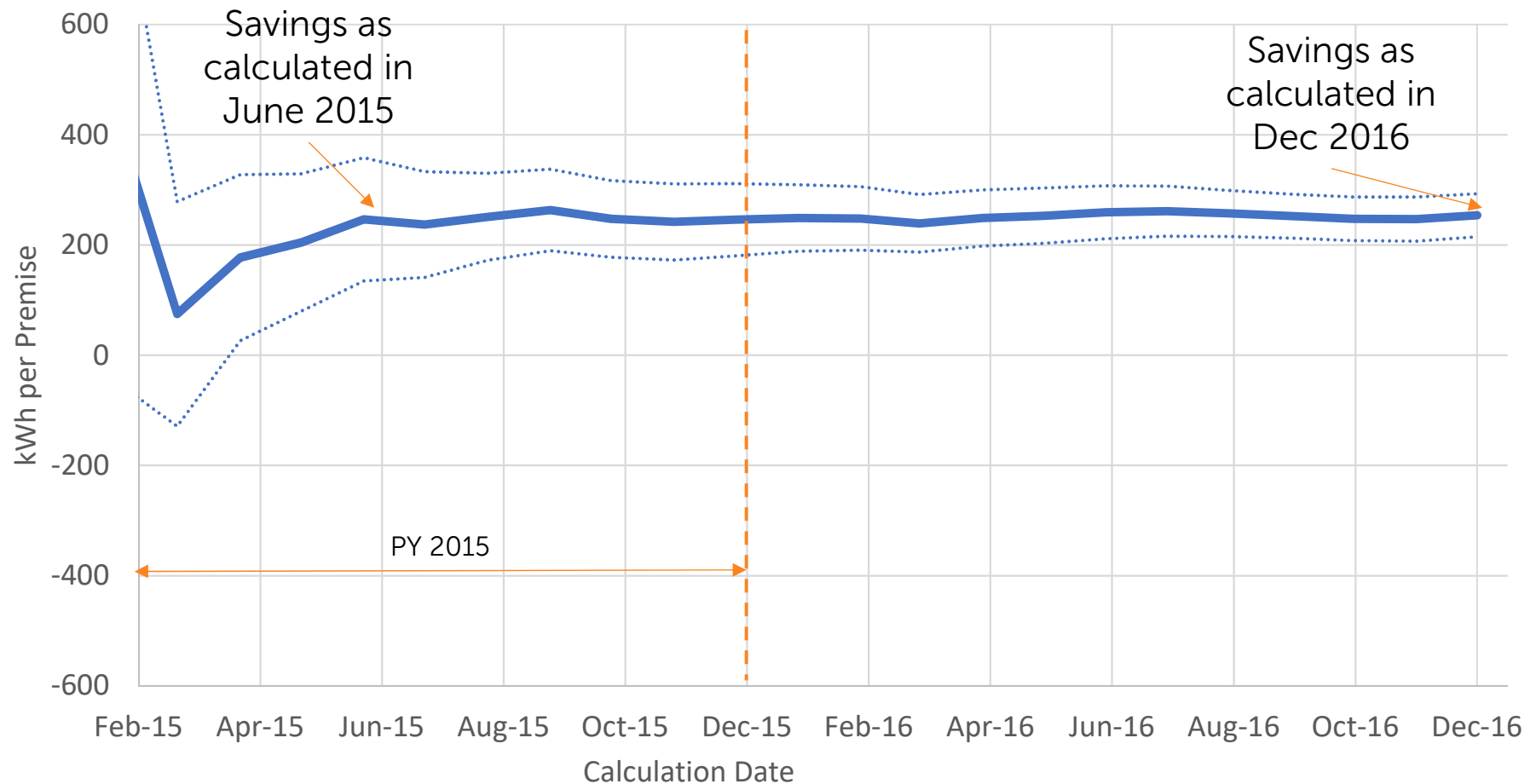Build weather-normalization models for each customer (Res or SMB)

Compare changes in usage for treated customers vs. overall population

Repeat analysis for all customers with each new addition of data

Generate dashboard of findings, analytics and actionable insights
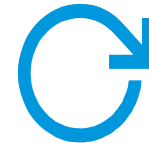
"Measure-as-you-Go" Example

M&V 2.0 provides a reliable estimate of savings by June

Embedding 2.0 into formal evaluation process

Formal EM&V: Illustrative example

EnergySavvy & EM&V firms jointly work together to evaluate programs

| Collaboration on models | Continuous reporting | Supplemental evaluator work | Early insights and feedback |

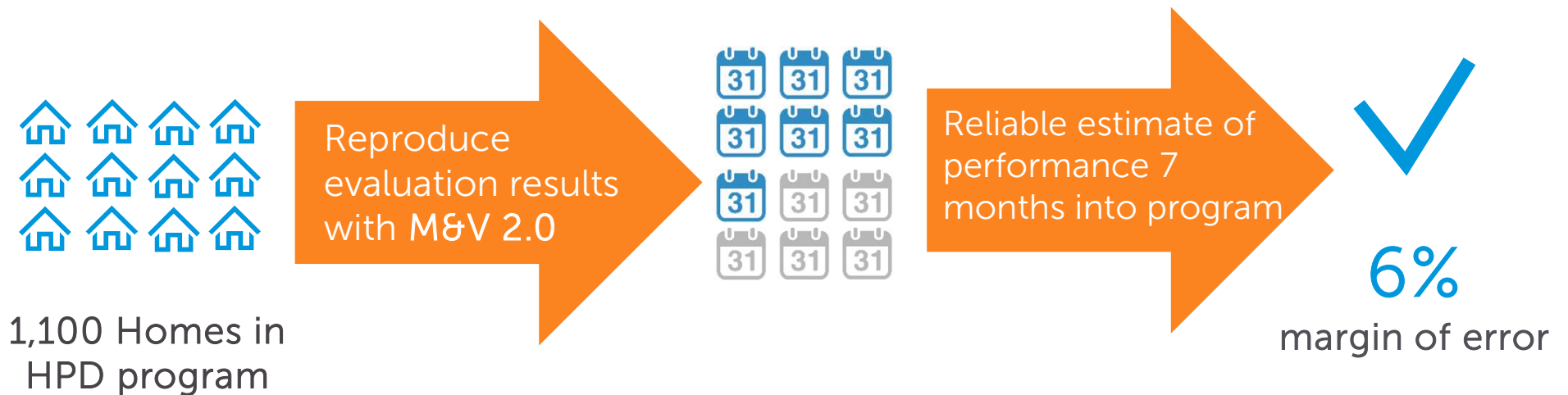# Basic Case Study

Does it work?
Is it accurate?
How long does it take?

Case Study: PSEG Long Island

Can M&V 2.0 match the existing results in less time? With Bi-monthly data!
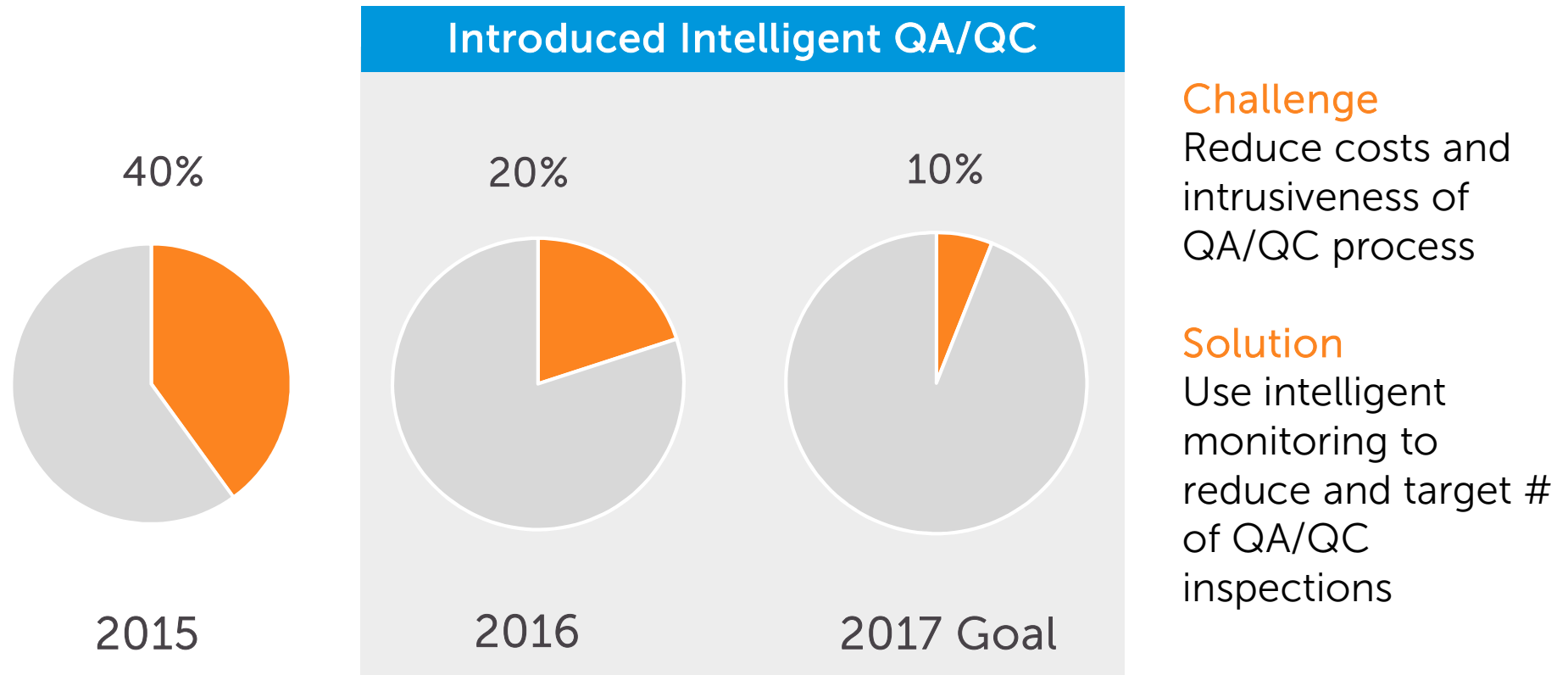
1,100 Homes in HPD program

Reproduce evaluation results with M&V 2.0

Reliable estimate of performance 7 months into program

6% margin of error

Case Study on Faster Feedback

What can be learned from faster M&V?

Case Study: Attic Inspections

Introduced Intelligent QA/QC

40%

2015

20%

2016

10%

2017 Goal

Challenge
Reduce costs and intrusiveness of QA/QC process

Solution
Use intelligent monitoring to reduce and target # of QA/QC inspections

APS shifted approximately 25% of the overall inspection budget to directly improve the program.

All percentages are the percent of total annual projects (assumes 2,000 projects/year)

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Appendix

M&V 2.0: FAQ's

AMI or Interval data?
- 2.0 applications are meter agnostic and work with interval, monthly or bi-monthly meter data

10% of savings?
- A billing analysis with an M&V 2.0 approach can estimate savings down to 2-3%

Black box?
- EnergySavvy provides a written methodology to clients, evaluators and regulators. Same as done by traditional evaluators.

Replacing evaluation?
- M&V 2.0 tools enhance and support formal third party evaluation. They are not intended as a replacement.

What can M&V 2.0 do?

Capabilities offered by M&V 2.0 tools

❖ Updating deemed savings with local actual data

❖ Assessing persistence with continuous measurement

❖ Replacing deemed savings for ex-post M&V for certain programs

❖ Measuring "net" savings for certain programs*

❖ Providing process improvement data to program administrators

❖ Launching new pilots or estimating savings from HEMS (e.g. smart thermostats)

❖ Can provide independent analysis to evaluator and program administrator

*SEEAction Impact Evaluation Guide, Large-scale consumption data analysis approaches. pg 5-4, 5-5

Where doesn't M&V 2.0 fit?

M&V 2.0 is not the best approach for all applications

- ❖ Artificial baselines require ex-post engineering adjustments to M&V 2.0 impact analysis
- ❖ M&V 2.0 cannot assess free ridership or spillover
- ❖ Not appropriate for certain program types (e.g. custom projects)
- ❖ Not designed for market studies or assessing penetration levels for certain technologies

M&V 2.0 and EM&V

M&V 2.0
- Continuous M&V
- Automated data collection & cleaning
- Self-serve data access
- Automated updates
- Rapid program feedback
- Interactive dashboards of results
- Rapid measurement of pilots

Overlap
- Grid impacts
- Deemed savings calibration
- Impact analysis
- Peak demand savings
- Resource Planning
- Net to Gross
- Reporting
- Process evaluation

EM&V
- Phone surveys
- On-site metering
- Market effects
- Cost effectiveness